REMARKS

The present Amendment amends claims 15, 18, 21 and 23-26 and leaves claims 16, 17, 19, 20 and 22 unchanged. Therefore, the present application has pending claims 15-26.

Applicants respectfully request the Examiner to contact Applicants Attorney, the undersigned, by telephone so as to discuss the outstanding issues of the present application prior to examination thereof.

Claim 23 stands objected to due to informalities noted by the Examiner in paragraph 3 of the Office Action. Amendments were made to claim 23 to correct the informalities noted by the Examiner. Particularly, amendments were made to claim 23 to make it dependent from claim 21. Therefore, this objection is overcome and should be withdrawn.

Claims 18-20 and 24-26 stand rejected under 35 USC §112, second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regards as their invention. Various amendments were made to claims 18-20 and 24-20 to bring them into conformity with the requirements of 35 USC §112, second paragraph. Therefore, Applicants submit that this rejection is overcome and should be withdrawn.

Specifically, amendments were made to claims 18-20 and 24-26 to overcome the objections noted by the Examiner in paragraph 4 of the Office Action.

The Examiner's cooperation is respectfully requested to contact Applicants' Attorney by telephone should any further indefinite matter be discovered so that appropriate amendments may be made.

Claims 15-26 stand rejected under 35 USC §103(a) as being unpatentable over Florent (U.S. Patent No. 5,406,501). This rejection is traversed for the following reasons. Applicants submit that the features of the present invention as now more clearly recited in claims 15-26 are not taught or suggested by Florent whether taken individually or in combination with any of the other references of record. Therefore, Applicants respectfully request the Examiner to reconsider and withdraw this rejection.

Amendments were made to each of the claims so as to clarify that according to the present invention differential images are derived by using images having different time intervals or that interframe subtraction is taken for respective regions with the frame time interval being changed for each region. These features of the present invention now more clearly recited in the claims are not taught or suggested by any of the references of record whether taken individually or in combination with each other. Particularly, these features of the present invention now more clearly recited in the claims are not taught or suggested by Florent.

Florent discloses generating a plurality of differential images and taking an average of data of these differential images (col. 5, lines 13-18). However, Florent does not teach or suggest any type of processing with respect to differential images each obtained from images having a different time interval as in the present invention. The Examiner refers to various portions of Florent, but these portions of Florent disclose that the differential images are those obtained from images having a single (fixed) time interval (that is, a constant interval at which images are input from the image pickup means). In fact, Florent specifically provides the following teachings:

The Abstract of Florent discloses that "differential images D are derived from succeeding (emphasis added) images R" (abstract, lines 4-5);

Table 1 of Florent discloses that D2,.1.1 is calculated from R_n and R_{n+1}, D_{n+2} from R_{n+1} and R_{n+2} and D_{n+3} from R_{n+2} and R_{n+3} (this is also described in col. 4, lines 16-21);

Col. 2, lines 59-67 of Florent discloses "deriving differential images D from succeeding (emphasis added) images R" (col. 2, lines 64-65); and Col. 4, lines 1-35 shows equation $D_n(I,j)=R_n(I,j)-R_{n-1}(I,j)$.

Therefore, it is quite clear from the above that there is no teaching or suggestion in Florent of processing differential images each obtained from images having a different time interval as in the present invention.

The Examiner further contends that "Setting the images is a matter of design choice such as wherein a template/background image (which can be the first input image or any other image in a sequence of images) may be used to obtain differential images from a sequence of images, different interval images may be used for obtaining differential images, etc. since any obtained differential image(s) will result in the detection of moving object, if one exists, in the sequence of images because there will be a difference in the data."

Applicants, however do not agree with the Examiner. In actual situations, the shorter the time interval is between two frames from which a differential image is derived, the less the amount of difference in the differential image gets. This is explained as follows. Suppose that a certain pixel of a moving object has a certain pixel value (luminance value). Those pixels that are in the "proximity" of said certain pixel also have pixel values

that are close to that of said certain pixel. Therefore if an apparent moving amount of the moving object is less than the range of such "proximity", there will be obtained no substantial difference (note that this property of pixel values being close to each other for the pixels within the range of the "proximity" is used in the art of image compression).

In other words, by changing the time interval between two image frames used for deriving a differential image, the difference appearing between the two image frames also changes which also is dependent upon the apparent moving amount of the moving object. Thus, by changing the time interval between two frames of an image from which a differential image is derived, it becomes possible to detect the difference appearing in the differential image of the moving object in dependence upon the apparent moving amount of the moving object. In this connection, it is apparent that the Examiner's contention of "if one (namely, moving object) exits, ... there will be a difference in the data" lacks the understanding that the property of closely placed pixels tending to have close pixel values and does not recognize the idea of the apparent moving amount of moving object.

Therefore, it is clear that the features of differential images being derived by using images having different time intervals (or taking inter-frame subtraction for respective regions with a frame time interval being changed for each region) as recited in the claims is not obvious from Florent or is not a matter of design choice as alleged by the Examiner.

Claims 16, 19, 22 and 25

The closer the distance between the image pickup means and the object is, the larger the apparent moving amount of the moving object in the

image inputted from the image pickup means gets (i.e., the difference becomes larger). Based on such characteristic, the claimed invention sets the values of the coefficients used for synthesizing a plurality of differential images.

Florent does not teach or suggest the producing of a plurality of differential images each derived from two frames of image having a different time interval and synthesizing (adding together) the produced differential images by controlling, based on said coefficients, the differential amounts in the differential images, which amounts differ due to the different distances between the imaging pickup means and moving objects as recited in the claims.

Claims 17, 20, 23 and 26

The larger the movement of the object is, the larger the apparent magnitude of movement of the moving object in the image inputted from the image pickup means gets (i.e., the difference becomes larger). Based on such characteristic, the claimed invention sets the values of the coefficients used for synthesizing a plurality of differential images.

Florent does not teach or suggest the producing of a plurality of differential images each derived from two frames of image having a different time interval and synthesizing (adding together) the produced differential images by controlling, based on said coefficients, the differential amounts in the differential images, which amounts differ due to differences in the magnitudes of movement of moving objects as recited in the claims.

Thus, as is clear from the above, Florent fails to teach or suggest a frame subtraction step of executing frame subtraction processing between an input image from the image pickup means and respective ones of a plurality of images each having a different time interval with respect to the time interval of the input image and a synthesizing step of adding together differential data obtained by the frame subtraction processing based on coefficients which are set for respective ones of predetermined regions of the image as recited in the claims.

Further, Florent fails to teach or suggest a frame subtraction step of executing frame subtraction processing for each of a plurality of predetermined regions of the image obtained from the image pickup means, wherein each of the predetermined regions has a frame time interval which is changed from the frame time intervals of each of the others of the predetermined regions and an object detecting step of detecting an object based on differential data obtained from the frame subtraction processing as recited in the claims.

Therefore, Florent fails to teach or suggest the features of the present invention as now more clearly recited in the claims. Accordingly, reconsideration and withdrawal of the 35 USC §103(a) rejection of claims 15-26 as being unpatentable over Florent is respectfully requested.

The remaining references of record have been studied. Applicants submit that they do not supply any of the deficiencies noted above with respect to the reference utilized in the rejection of claims 15-26.

In view of the foregoing amendments and remarks, applicants submit that the present application is now in condition for allowance based on claims 15-26. Accordingly, early allowance of claims 15-26 is respectfully requested.

To the extent necessary, the applicants petition for an extension of time under 37 CFR 1.136. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, or credit any overpayment of fees, to the deposit account of MATTINGLY, STANGER, MALUR & BRUNDIDGE, P.C., Deposit Account No. 50-1417 (500.40713X00).

Respectfully submitted,

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